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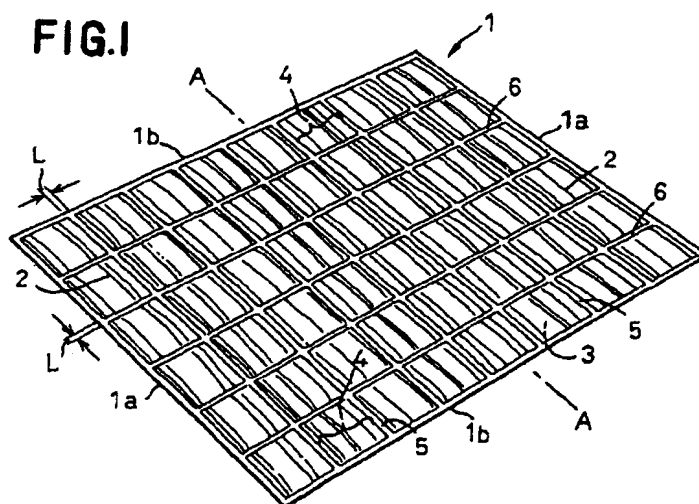
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(54) **Mechanical fastener**

(57) A mechanical fastener including a loop member 1 includes a base sheet 3 and a plurality of continuous filaments 2 extending substantially parallel one to another on one surface of the base sheet 3 substantially parallel one direction and the filaments 2 are bonded to

the base sheet 3 along at least a pair of bonding zones 5, 6 extending transversely of the filaments 2 to form a plurality of loop elements 4a extending between the pair of bonding zones 5, 6.



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bonding zones 5 define compressed grooves.

[0018] With this loop member 1, when a hook member (not shown) formed with a plurality of hook elements is pressed against the loop member 4, the hook elements are inserted into gaps among the loop elements 4a and caught by these loop elements 4a so that the hook member may be anchored on the loop member 1. The hook member may be pulled away from the loop member 1 to disengage the respective hook elements from the respective loop elements 4a and thereby to separate the hook member from the loop member 1.

[0019] There is no concern that one or more filaments might fall off from the loop-crowded regions 4 which might consequently become fluffy unless the filaments are snapped or worn. This is for the reason that none of the filament ends exists in the loop-crowded regions 4.

[0020] The filaments 2 may have a length of 1 ~ 30 mm as measured between each pair of the adjacent bonding zones 6. The length less than 1 mm would be too short to form the loop elements 4a. The length larger than 30 mm would cause the loop elements 4a to be readily slacken, resulting in disengagement of the hooks from the loop elements 4a.

[0021] A fineness of the filaments 2 may be in a range of 0.5 ~ 60.0 deniers. With the fineness less than 0.5 deniers, a strength of the filaments 2 would excessively decrease, possibly resulting in breakage of the filaments 2 as the hook elements are being separated from the loop elements 4a. With the fineness larger than 60.0 deniers, it would sometimes impossible to engage the hook elements with the loop elements 4a, depending on a size of the hook elements.

[0022] A basis weight of the filaments 2 may be in a range of 20 ~ 150 g/m². With the basis weight less than 20 g/m², a density of the filaments 2, i.e., the number of the loop elements 4a per unit area would be insufficient to ensure a reliable engagement between the loop member 1 and the hook member. With the basis weight larger than 150 g/m², a density of the filaments 2, i.e., a bulkiness of the loop-crowded regions 4 would be unacceptably increased and the loop elements 4a would prevent the hook elements from being sufficiently inserted into the gaps among the loop elements 4a to ensure the firm engagement between the loop member 1 and the hook member.

[0023] The bonding zones 5 as well as the bonding zones 6 may have a width L of 0.5 ~ 5.0 mm. With the width less than 0.5 mm, the filaments 2 would easily get out of the respective bonding zones 5, 6 and it is concerned that the filaments 2 might be peeled off from the base sheet 3 along the bonding zones 5, 6. With the width larger than 5.0 mm, an area ratio of the bonding zones 5, 6 to the loop member 1 would be too high to ensure a predetermined area over which the loop-crowded regions 4 should be formed on the loop member 1.

[0024] The loop member 1 is not limited to that of

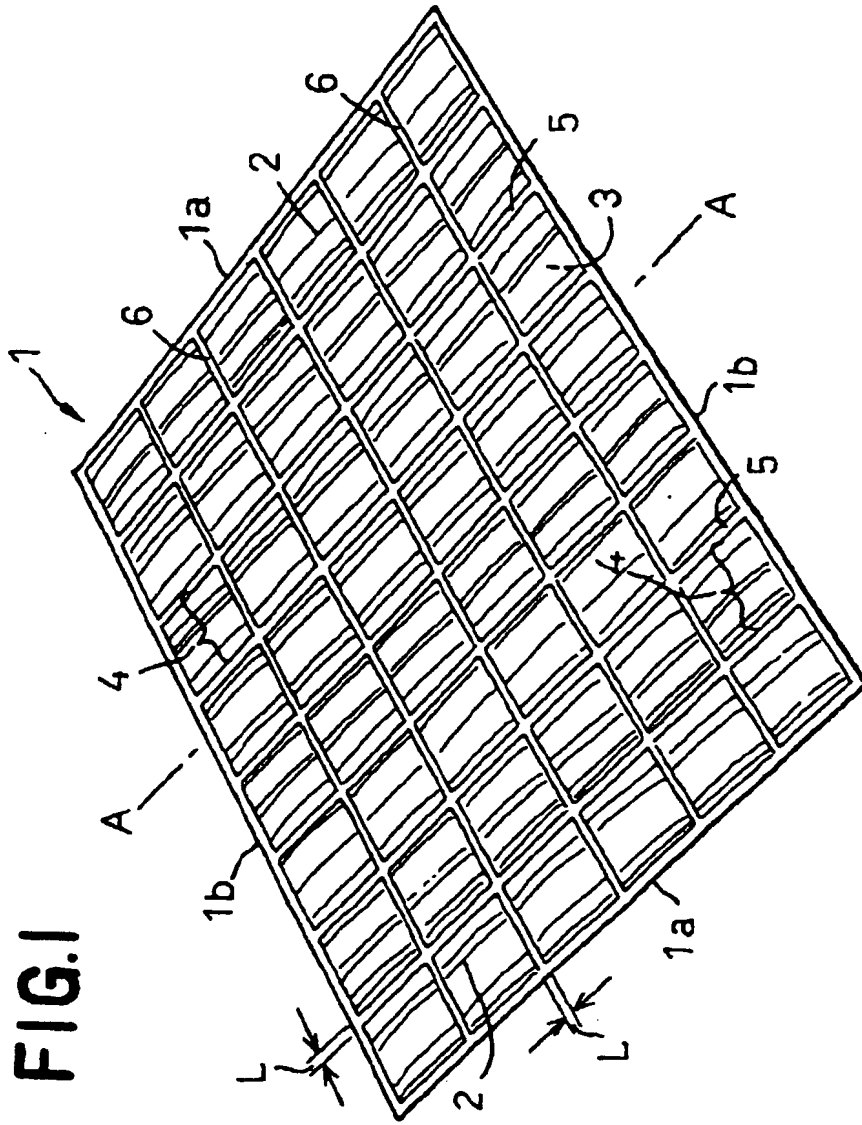
the rectangular shape as illustrated but may be of the other shape such as of polygonal, circular or oval shape. It is possible without departing from the scope of this invention to bond the filaments 2 to the base sheet 3 only along the bonding zones 6. It is not essential for this invention that the bonding zones 5 and the bonding zones 6 should extend substantially parallel to and orthogonally of the filaments 2, respectively, and this invention covers also the case in which these bonding zones 5, 6 extend obliquely of the filaments 2.

[0025] Fig. 3 is a view similar to Fig. 1 showing another embodiment of the loop member 1. According to this embodiment, an entire area of the loop member 1 is divided in two substantially equal sections 7, 8. In the section 7, a plurality of filaments 2 extend substantially parallel to the bonding zones 5 and, in the section 8, a plurality of filaments 2 extend substantially parallel to the bonding zones 6. In the case of the loop member 1 according to this embodiment, the filaments 2 lying substantially the section 7 extend orthogonally of the filaments 2 lying in the section 8 wherein the filaments 2 are bonded to the base sheet 3 along the bonding zones 5, 6. The particular bonding zones 5 substantially bisecting a dimension between the transversely opposite side edges 1a defines a boundary line of these two sections 7, 8.

[0026] Fig. 4 is a perspective view of a disposable diaper 20 adopting the loop member 1 shown in Fig. 3 and Fig. 5 is a sectional view taken along line B - B in Fig. 4. Fig. 4 illustrates two situations in which the loop member 1 and a tape fastener 12 are in engagement with each other and not in engagement with each other. The diaper 20 is provided on transversely opposite side edges of a front waist region 10 with the loop members 1 bonded to a backsheet 14 by means of an adhesive agent 15. On the other hand, the diaper 20 is provided on transversely opposite side edges of a rear waist region 11 with the tape fasteners 12 having their proximal ends bonded to the backsheet 14. The loop members 1 function as pieces of target tape for the associated tape fasteners 12. The respective tape fasteners 12 are provided on their free ends with hook members 13 which are, in turn, formed with a plurality of mushroom-shaped hook elements 13a. As seen on the left hand of Fig. 5, these hook elements 13a are caught by the loop elements 4a.

[0027] In the section 7, the filaments 2 extend longitudinally of the diaper 20. Such arrangement is effective to keep the loop member 1 and the hook member 13 in firm engagement with each other even if the diaper 20 put on the wearer's body is placed under tension directed transversely of the diaper 20, depending on movement of the wearer's body.

[0028] In the section 8, the filaments 2 extend transversely of the diaper 20. Such an arrangement is effective to keep the loop member 1 and the hook member 13 in firm engagement with each other even if the diaper 20 put on the wearer's body is placed under tension



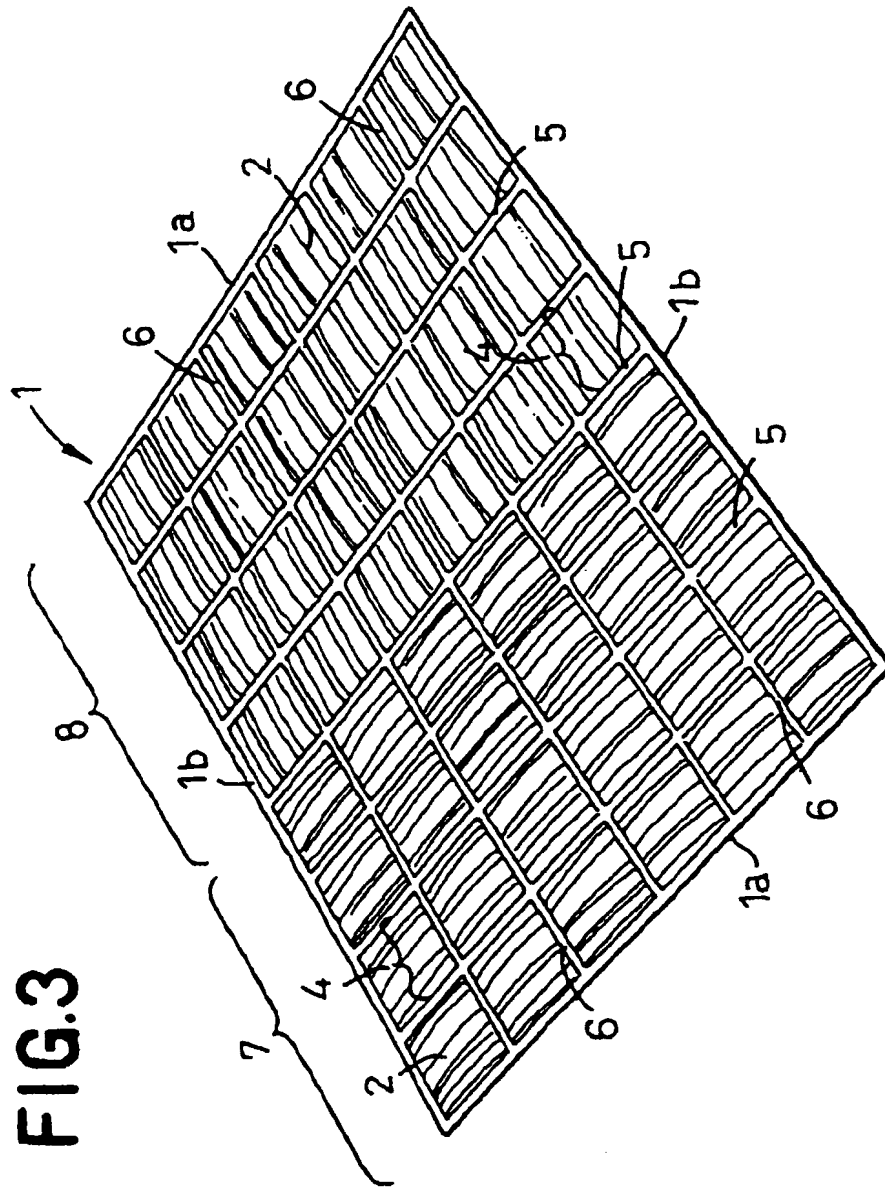


FIG.3

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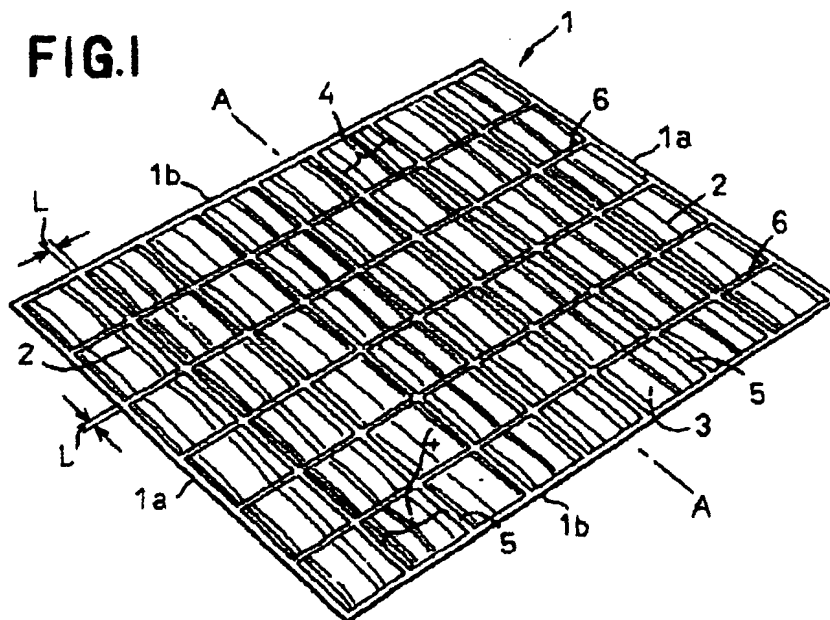
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parallel one direction and the filaments 2 are bonded to the base sheet 3 along at least a pair of bonding zones 5, 6 extending transversely of the filaments 2 to form a plurality of loop elements 4a extending between the pair of bonding zones 5, 6.

FIG.1



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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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17-07-2001

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